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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/772,959	02/04/2004	Seong Hoon Kim	139-012C	5306

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EXAMINER

CHEN, TIANJIE

ART UNIT PAPER NUMBER

2652

DATE MAILED: 01/25/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/772,959

Applicant(s)

KIM ET AL.

Examiner

Tianjie Chen

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-21 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-5,9-16,20,21 is/are rejected.
- 7) ☒ Claim(s) 6-8 and 17-19 is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 06/28/2004.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: ____.

Non-Final Rejection

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which the subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

1. Claims 1-5, 9-16, 20, and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ikeda et al (US 6,115,213) in view of Harrison et al (US 2002/0135933).

Claims 1 and 10, Ikeda et al shows a disk drive/ a medium enclosure for a disk drive in Figs. 1 and 2, including: a disk drive cover 15 including an top surface separated from an upper disk surface of the disk drive by essentially a first gap; a disk drive base including a bottom surface (Fig. 2) separated from a lower disk surface of the disk drive by essentially a second gap; and a disk containing each member of a disk surface collection including the upper disk surface and the lower disk surface; wherein all of the disk surface collection members rotate at an operating rotational velocity; wherein rotation of the disk surface collection member at the operating rotational velocity creates a boundary layer thickness from the disk surface collection members, for each of the disk surface collection members; wherein the disk drive cover further includes a second top surface region formed to facilitate the motion of an actuator arm between the disk cover and the upper disk surface; wherein each member of a gap collection is rather small since $h=0.5$ mm and $d=1.5$ mm (Fig. 2 and column 10 lines 20-26); wherein the gap collection is comprised of the first gap and

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the second gap; wherein the disk drive has a height of at most millimeters 13 mm (Column 10, lines 27-28).

Ikeda et al does not show that the operating rotational velocity is at least 5400 revolutions per minute and each member of a gap collection is at most the boundary layer thickness.

Harrison et al shows a disk drive, wherein the operating rotational velocity is at least 5400 revolutions per minute ([0040]) and each member of a gap collection is 0.66 mm ([0044], line 14), which is less than 0.7 mm of the boundary layer thickness at speed of 5400 RPM.

It would have been obvious at the time the invention was made to one of ordinary skill in the art to set the operating rotational velocity is at least 5400 revolutions per minute and each member of a gap collection is at most the boundary layer thickness as taught by Harrison et al. The rationale is as follows: Ikeda discloses a disk drive with gaps, the thickness of the gaps are much small than the distance of $d-h=1.0\text{mm}$. But fails to specify the thickness of the gap. Ikeda et al also is silent on the speed. But Ikeda teaches that the disk drive is considered as for mass storage system (Column 2, lines 5-6). Harrison teaches that for store large amount of data ([0003]), the speed is set at least 5400 RPM ([0040]), the gap thickness D should be reduced ([0040] lines 7-8) to avoid turbulent ([0038]) to reduce run-out errors within the drive ([0007], lines 5-7); and found 0.66 mm is a preferred number [0044] line 14). One of ordinary skill in the art would have been motivated to set the operating rotational velocity at 5400 revolutions per minute and each member of a gap collection is 0.66mm, which is less than 0.7 mm, which is the boundary layer thickness at speed of 5400 RPM, for reducing the run-out error.

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Claims 2, 11, and 12, Ikeda et al further shows in Fig. 2 that the disk drive base further includes a second top/bottom surface at 8 formed to facilitate the motion of an actuator arm between the disk drive base and the lower disk surface.

Claims 3-5 and 13-16, Harrison et al further shows the operating rotational velocity is at least 7200 revolutions per minute/ 10,000 revolutions per minute/ 14,000 revolutions per minute ([0040]).

Claim 9, Ikeda et al further shows in Fig. 1 the actuator positions essentially one read-write head accessing one member of the disk surface collection.

Claim 20, Ikeda et al further shows a method of making a disk drive from the disk drive cover of described above and from the disk drive base as described above, including the steps of: using the disk drive cover to assemble the disk drive; and using the disk drive base to assemble the disk drive.

Claim 21, Ikeda et al and Harrison shows as a product of the process as described above.

Allowable Subject Matter

2. Claims 6-8 and 17-19 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

- As the closest reference, the combination of Ikeda et al (US 6,115,213) and Harrison et al (US 2002/0135933) shows a disk drive including a gap collection, wherein the gap collection member is at most the boundary layer thickness; **but fails to** show that the gap collection member is at most three quarters/ one half/ and one third of the boundary layer thickness.

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- Applicant asserts that a significant reduction in disk surface mechanical fluttering results from reducing the air gap between stationary surfaces facing the disk surface to about the boundary layer thickness. The inventors have found that when the air gaps are approximately the boundary layer thickness, there is improved head positioning. When the air gaps are smaller fractions of the boundary layer thickness, there are further improvements in head positioning (p. 3, lines 20-25).

Conclusion

3. The prior art made of record in PTO-892 Form and not relied upon is considered pertinent to applicant's disclosure.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tania Chen whose telephone number is (703) 305-7499. The examiner can normally be reached on 8:00-4:30, Mon-Fri.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Hoax Nguyen can be reached on (703) 305-9687. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


TIANJIE CHEN
PRIMARY EXAMINER